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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,402	03/26/2004	Cristian E. Anghel	H0005161/2929-0229P	7541

7590 03/03/2006

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EXAMINER	
MOFFAT, JONATHAN	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/809,402	ANGHEL ET AL.
	Examiner	Art Unit
	Jonathan Moffat	2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/26/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's amendments to the claims, filed 2/6/2006, are accepted and appreciated by the examiner. In response to applicant's amendments, previous grounds for rejection are withdrawn and the examiner submits the following new grounds for rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1.

Claims 1-4, 9-10, 13-17, 22-23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patel (US pat 6,163,127) in view of Rozman (US pat 5493200).

With respect to claims 1 and 14, Patel discloses a method and associated apparatus comprising:

1) A first rotor position determining unit for generating first rotor position values by applying a first indirect rotor position calculation technique, which emulates a resolver, and wherein said first indirect rotor position calculation technique generates first rotor position values (column 3 lines 48-54).

2) A second rotor position deriving unit for generating second rotor position values by applying a second indirect rotor position calculation technique (column 3 lines 63-67).

3) A rotor position result output unit for outputting rotor position results over a range of rotor speeds as a function of said first rotor position values, said second rotor position values, and rotor speed (column 4 lines 1-5 and Fig 3).

With respect to claims 2 and 15, Patel discloses a control unit for controlling said rotor position output unit as a function of rotor speed (Fig 1 item 13 and Fig 3).

With respect to claims 3 and 16, Patel discloses:

1) Said rotor position result output unit outputs said first rotor position values as rotor position results during a first operating mode (Fig 3).

2) Said rotor position result output unit outputs said second rotor position values as rotor position results during a second operating mode (Fig 3).

With respect to claims 4 and 17, Patel discloses that said rotor position result output unit operates in said first operating mode at low rotor speeds and operates in said second operating mode at higher rotor speeds (Fig 3).

With respect to claims 9 and 22, Patel discloses a synchronous machine.

With respect to claims 13 and 26, Patel discloses that the second indirect rotor position calculation technique calculate rotor position based on back EMF (column 3 lines 63-67).

With respect to claims 1 and 14, Patel fails to disclose:

1) Said first indirect rotor position calculation technique generates first rotor position values as a function of AC excitation supplied to a field winding of the synchronous machine rotor.

With respect to claims 9 and 22, Patel fails to disclose said synchronous machine be brushless.

With respect to claims 10 and 23, Patel fails to disclose measuring position of a rotor in a gas turbine engine.

Rozman teaches, with respect to claims 1 and 14:

1) Said indirect rotor position calculation technique generates first rotor position values as a function of AC excitation supplied to a field winding of the synchronous machine rotor (Fig 1 item 28).

It would have been obvious to one of ordinary skill in the art to modify the method and system of Patel to function with an AC excited field winding motor as taught by Rozman. The difference lies in that Rozman discloses a motor with excitable field windings whereas those of Patel are permanent magnets. Both references, however, disclose synchronous motors with control and the ability to monitor position indirectly using back EMF. It would have been obvious then to monitor a motor such as that of Rozman using the system of Patel.

Rozman teaches, with respect to claims 9 and 22, said synchronous machine is a synchronous brushless machine (column 1 lines 5-7).

It would have been obvious to one of ordinary skill in the art to apply the method and apparatus of Patel to a brushless system in place of the system of Rozman. The system of Patel requires no modification to work with a brushless motor and application to multiple types of motors would make the system of Patel more robust.

Rozman teaches, with respect to claims 10 and 23, said rotor is on a shaft coupled to a gas turbine engine of an aircraft (column 1 lines 10-30).

It would have been obvious to one of ordinary skill in the art to apply the method and apparatus of Patel in the application of Rozman. It is common in the art to monitor the rotor of a

startup motor coupled to a gas turbine (Rozman) in order to monitor startup speeds and energy. This would require not modification of the system and method of Patel.

2.

Claims 5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patel (US pat 6163127) and Rozman (US pat 5493200) as applied to claims 3 and 16 above further in view of Caroboiante (EP 0 558 261).

With respect to claims 5 and 18, Patel discloses a control unit for controlling said rotor position result output unit as a function of rotor speed (Fig 3).

Patel and Rozman fail to disclose using a phase-locked loop method to compensate the first method during a third operating mode.

Caroboiante teaches that said rotor position result output unit outputs said first rotor position values as rotor position results during a third operating mode and executes a phase-locked loop operation to control said second rotor position deriving unit during said third operating mode such that errors between second rotor position values and first rotor position values are reduced (Fig 3 and column 6).

It would have been obvious to one of ordinary skill in the art to add a third transition mode to the method and system of Patel and Rozman as suggested by Caroboiante. This will prevent any spikes or other erroneous data associated with the switch between the two position methods allowing for a smooth transition (Patel column 4 lines 1-5).

3.

Claims 6-7 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patel (US pat 6163127) and Rozman (US pat 5493200) as applied to claims 3 and 16 above further in view of Quirion (US pat pub 20050151502).

With respect to claims 6 and 19, Patel discloses a smooth transition method between the first and second operating modes (column 4 lines 1-5)

With respect to claims 7 and 20, Patel discloses a smooth transition method between the first and second operating modes (column 4 lines 1-5).

With respect to claims 6 and 19, Patel and Rozman fail to disclose a weighted combination of the two.

With respect to claims 7 and 20, Patel and Rozman fail to disclose weighting the second method more heavily than the first.

Quirion teaches, with respect to claims 6 and 19, said rotor position result output unit outputs a weighted combination of first and second rotor position values during a transitional operating mode (pg 3 section 0065 and Fig 6).

It would have been obvious to one of ordinary skill in the art to implement the smooth transition of Patel and Rozman by using a weighted combination of both methods as does Quirion. This weighted combination will allow for one method to be more heavily relied upon than the other which is obvious in the light of EMF being a more reliable method over a larger range of speeds.

Quirion teaches, with respect to claims 7 and 20, a weighted combination such that the second rotor position values are given more weight as rotor speed increases (pg 4 section 0068).

It would have been obvious to one of ordinary skill in the art to implement the smooth transition of Patel and Rozman by using the weighted combination of both methods as does Quirion. This weighted combination will allow for one method to be more heavily relied upon

than the other which is obvious in the light of EMF being a more reliable method over a larger range of speeds.

4.

Claims 8, 11-12 and 21, 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patel (US pat 6163127) and Rozman (US pat 5493200) as applied to claims 1 and 14 above further in view of Jansen (US pat 5,585,709).

With respect to claims 11 and 24, Patel discloses said first method emulating a position sensor (column 3 lines 48-54).

With respect to claims 12 and 25, Patel discloses that the first method signals emulate a resolver (column 3 lines 48-54).

With respect to claims 8 and 21, Patel and Rozman fail to disclose a first position deriving unit comprising a band-pass filter and converter.

With respect to claims 11 and 24, Patel and Rozman fail to disclose a two-phase quadrature signal.

With respect to claims 12 and 25, Patel and Rozman fail to disclose using two-phase quadrature signals.

Jansen teaches, with respect to claims 8 and 21, a unit and method comprising:

1) A band-pass filter that filters phase voltage signals output from main stator windings of said synchronous machine during AC excitation, thereby extracting a rotor position-indicating component from said phase voltage signals (Fig 4a item 87 and Fig 4b item 94).

2) A converter that converts the filtered phase voltages into balanced two-phase quadrature signals, said balanced two-phase quadrature signals indicating positioning of said rotor (Fig 1 item 43).

It would have been obvious to one of ordinary skill in the art to use the system and method of Jansen as the resolver emulating system and method of Patel and Rozman in order to derive an accurate reading of low speed rotor position.

Jansen teaches, with respect to claims 11 and 24, that the two-phase quadrature signals are used as inputs to emulate a position sensor in a drive system of the synchronous machine (column 6 line 66 – column 7 line 9).

It would have been obvious to one of ordinary skill in the art to use the system and method of Jansen as the resolver emulating system and method of Patel in order to derive an accurate reading of low speed rotor position.

Jansen teaches, with respect to claims 12 and 25 two-phase quadrature signals used as inputs (column 6 line 66- column 7 line 9).

It would have been obvious to one of ordinary skill in the art to use the system and method of Jansen as the resolver emulating system and method of Patel and Rozman in order to derive an accurate reading of low speed rotor position.

Response to Arguments

Applicant argues that the prior art of reference Patel fails to disclose AC excited field windings. The examiner agrees with the distinction between the newly amended claims and Patel. However, as the amendment alters the scope of the claimed invention by limiting it further to motors comprising AC excited field windings, the claims stand rejected on new grounds for rejection stated above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Moffat whose telephone number is (571) 272-2255. The examiner can normally be reached on Mon-Fri, from 7:15-3:45.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

2/23/06
JM

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